

## USING CLEAN ENERGY FOR SUSTAINABLE DEVELOPMENT IN VIETNAM: FACTS AND SOLUTIONS

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### ABSTRACT

Using clean energy is a recent trend around the world. It is a good way to protect the environment and implement the Sustainable Development Goals of the United Nations. Following that trend, in recent years, the Vietnam government has enacted many legal policies and regulations to encourage everybody to use clean energy to live and develop economics. This paper analyzed the facts and problems of using clean energy as well as law and regulation in Vietnam, in comparison with other countries around the world. Then, some solutions to improve the problems related to using clean energy in Vietnam for the next period are recommended. Methodologies such as analysis of Vietnam's legal policy and documents (law and regulations) related to energy activities were used. The hypotheses developed during the study shows how to use law and regulation to govern energy activities in Vietnam.

**Keywords:** Clean energy; Law and regulation; Sustainable development; Vietnam

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## Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

### 1. INTRODUCTION

The 2030 Agenda for Sustainable Development, adopted by United Nations in 2015, provides a shared blueprint for peace and prosperity for people and the planet. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They called for improving health and education, reducing inequality, and spurring economic growth together with tackling climate change and working to preserve our oceans and forests. The 7th Sustainable Development Goal is to ensure access to affordable, reliable, sustainable, and modern energy for all.

Vietnam is in the process of industrialization and modernization. Therefore, ensuring the demand for energy for rapid and sustainable economic development, maintaining national defense, political security, social order, and safety, and constantly improving people's living are particularly important. Over the years, Vietnam has had many policies to invest in and support the energy industry in many aspects. The Politburo of Vietnam has issued Conclusion No. 26-KL/TW in 2003<sup>1</sup> on the Strategy and Planning for the Development of Vietnam's Electricity Industry, and Resolution No. 18-NQ/TW in 2007<sup>2</sup> on the orientation of Vietnam's National Energy Development Strategy to 2020 with Vision to 2045. In response to the participation of the political system, the business community, and society, in recent years, the country's energy industry, in general, and the electricity industry, in particular, have made rapid and relatively faster developments. Ministries in all sub-sectors and fields have closely followed the orientation and achieved many specific goals set out. In response to the socio-economic development requirements of the 2021-2030 period. Based on this Resolution, the National Assembly will study, amend, and supplement the law to create favourable conditions for national energy development. Resolution 55NQ/TH<sup>3</sup> is highly appreciated by ministries, institutions, local bodies, the business community, investors, and domestic and international experts. The good implementation of this Resolution is expected to create breakthrough developments for Vietnam's energy industry in the next decades.

#### 1.1 Sustainable Development Goals of the United Nation

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people

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<sup>1</sup> <<https://en.vietnamplus.vn/politburo-issues-conclusion-on-overseas-vietnamese-affairs/206760.vnp>> accessed 21 January 2022.

<sup>2</sup> <<https://policy.asiapacificenergy.org/sites/default/files/No-%201855%3AQD-TTg.pdf>> accessed 15 January 2022.

<sup>3</sup> Resolution No 55NQ/TW on the orientation of the National Energy Development Strategy of Vietnam to 2030 <<https://climate-laws.org/geographies/vietnam/policies/resolution-no-55nq-tw-on-the-orientation-of-the-national-energy-development-strategy-of-vietnam-to-2030#:~:text=This%20resolution%20reviews%20the%20National,structure%20of%20the%20energy%20sector>> accessed on 13 January 2022.

## Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

enjoy peace and prosperity<sup>4</sup>. The 17 SDGs are integrated recognizing that the action in one area will affect outcomes in other areas and that development must balance social, economic, and environmental sustainability. The creativity, know-how, technology, and financial resources from all of society are necessary to achieve the SDGs in every context.

Climate change is a real and undeniable threat to our entire civilization. The effects are already visible and will be catastrophic unless we act now.<sup>5</sup> Through education, innovation, and adherence to our climate commitments, we can make the necessary changes to protect the planet. These changes also provide huge opportunities to modernize our infrastructure, which will create new jobs and promote greater prosperity across the globe. Renewable energy solutions are becoming cheaper, more reliable, and more efficient every day. Our current reliance on fossil fuels is unsustainable and harmful to the planet, which is why we have to change the way we produce and consume energy. Implementing these new energy solutions as fast as possible is essential to counter climate change, one of the biggest threats to our survival. To ensure access to sustainable energy, we all have to take action. The relevant Goals envision the following<sup>6</sup>:

- i. Universal access to modern energy. By 2030, ensure universal access to affordable, reliable, and modern energy services. Increase the global percentage of renewable energy. By 2030, increase substantially the share of renewable energy in the global energy mix.
- ii. Double the improvement in energy efficiency. By 2030, double the global rate of improvement in energy efficiency.
- iii. Promote access to research, technology, and investments in clean energy. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.
- iv. Expand and upgrade energy services for developing countries. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular, least developed countries, small island developing States, and landlocked developing countries, following their respective programs of support.

### 1.2 Paris Convention 2015 on Climate change

At COP 21 in Paris, on 12 December 2015, Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low

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<sup>4</sup> <<https://www.un.org/development/desa/disabilities/envision2030.html>> accessed 3 April 2022.

<sup>5</sup> Henry K.H. Wang, *Climate Change and Clean Energy Management* (Routledge, 1<sup>st</sup> edition, 2019), p.192.

<sup>6</sup> <<https://www.un.org/development/desa/disabilities/envision2030-goal7.html>> accessed 3 April 2022.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

carbon future<sup>7</sup>. The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to increase the ability of countries to deal with the impacts of climate change, and at making finance flows consistent with low greenhouse gases (GHG) emissions and climate-resilient pathways. To reach these ambitious goals, appropriate mobilization and provision of financial resources, a new technology framework, and enhanced capacity-building are to be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their national objectives. The Agreement also provides for an enhanced transparency framework for action and support.

The Paris Agreement requires all Parties to put forward their best efforts through “nationally determined contributions” (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and their implementation efforts. There will also be a global stock-take every 5 years to assess the collective progress towards achieving the purpose of the agreement and to inform further individual actions by Parties.

The Paris Agreement opened for signature on 22 April 2016 – the Earth Day – at UN Headquarters in New York. It entered into force on 4 November 2016, 30 days after the so-called “double threshold”<sup>8</sup> had been met. Since then, more countries have ratified and continue to ratify the Agreement, reaching a total of 125 Parties in early 2017.

To make the Paris Agreement fully operational, a work program was launched in Paris to develop modalities, procedures, and guidelines on a broad array of issues. Since 2016, Parties work together in the subsidiary bodies (e.g., SBSTA<sup>9</sup>, and SBI<sup>10</sup>) and various constituted bodies<sup>11</sup>. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) met for the first time in conjunction with COP22 in Marrakesh<sup>12</sup> and adopted its first two decisions. The work program is expected to be completed by 2018.

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<sup>7</sup> <<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>> accessed 3 April 2022.

<sup>8</sup> Ratification by 55 countries that account for at least 55% of global emissions

<sup>9</sup> <<https://unfccc.int/process/bodies/subsidiary-bodies/sbsta>> accessed 3 April 2022.

<sup>10</sup> <<https://unfccc.int/process/bodies/subsidiary-bodies/sbi>> accessed 3 April 2022.

<sup>11</sup> <<https://unfccc.int/process-and-meetings/bodies/the-big-picture/what-are-governing-process-management-subsidiary-constituted-and-concluded-bodies#:~:text=Subsidiary%20bodies,-Subsidiary%20Body%20for&text=The%20SBSTA%20assists%20the%20governing,Protocol%20and%20the%20Paris%20Agreement>> accessed 3 April 2022.

<sup>12</sup> <<https://www.un.org/sustainabledevelopment/cop22/>> accessed 12 April 2022.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

The Paris Agreement, adopted through Decision 1/CP.21, addresses crucial areas necessary to combat climate change. Some of the key aspects of the Agreement are set out below:

- i. Long-term temperature goal<sup>13</sup>, in seeking to strengthen the global response to climate change, reaffirms the goal of limiting global temperature increase to well below 2 degrees Celsius while pursuing efforts to limit the increase to 1.5 degrees.
- ii. Global peaking and 'climate neutrality'. To achieve this temperature goal, Parties aim to reach global peaking of greenhouse gas emissions (GHGs) as soon as possible, recognizing<sup>14</sup> peaking will take longer for developing countries Parties, to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of the century.
- iii. Voluntary cooperation/market- and non-market-based approaches<sup>15</sup> recognizes the possibility of voluntary cooperation among Parties to allow for higher ambition and sets out principles – including environmental integrity, transparency, and robust accounting – for any cooperation that involves internationally transferal of mitigation outcomes. It establishes a mechanism to contribute to the mitigation of GHG emissions and support sustainable development and defines a framework for non-market approaches to sustainable development.
- iv. Establish a global goal of adaptation of enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change in the context of the temperature goal of the Agreement.<sup>16</sup> It aims to significantly strengthen national adaptation efforts, including through support and international cooperation. It recognizes that adaptation is a global challenge faced by all. All Parties should engage in adaptation, including by formulating and implementing National Adaptation Plans, and should submit and periodically update an adaptation communication describing their priorities, needs, plans, and actions. The adaptation efforts of developing countries should be recognized.
- v. The importance of averting, minimizing, and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage. Parties are to enhance understanding, action, and support, including through the Warsaw International Mechanism, on a cooperative and facilitative basis concerning loss and damage associated with the adverse effects of climate change.<sup>17</sup>

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<sup>14</sup> Art. 4 The Paris Agreement 2015.

<sup>15</sup> Art. 6 – The Paris Agreement 2015.

<sup>16</sup> Adaptation (Art. 7) – The Paris Agreement 2015.

<sup>17</sup> Loss and damage (Art. 8) – The Paris Agreement 2015.



### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

- vi. Finance, technology, and capacity-building support<sup>18</sup> reaffirms the obligations of developed countries to support the efforts of developing country Parties to build clean, climate-resilient futures, while for the first time encouraging voluntary contributions by other Parties. The provision of resources should also aim to achieve a balance between adaptation and mitigation. In addition to reporting on finance already provided, developed country Parties commit to submit indicative information on future support every 2 years, including projected levels of public finance. Climate change education, training as well as public awareness, participation, and access to information are also to be enhanced under the Agreement<sup>19</sup>.
- vii. A “global stock-take”, to take place in 2023 and every 5 years thereafter, will assess collective progress toward achieving the purpose of the Agreement in a comprehensive and facilitative manner.<sup>20</sup> It will be based on the best available science and its long-term global goal. Its outcome will inform Parties in updating and enhancing their actions and support and enhancing international cooperation on climate action.
- viii. Decision 1/CP.21 also sets out several measures to enhance action before 2020, including strengthening the technical examination process, enhancing of provision of urgent finance, technology, and support, and measures to strengthen high-level engagement. For 2018 a facilitative dialogue is envisaged to take stock of collective progress towards the long-term emission reduction goal of Art 4. The decision also welcomes the efforts of all non-Party stakeholders to address and respond to climate change, including those of civil society, the private sector, financial institutions, cities, and other subnational authorities. These stakeholders are invited to scale up their efforts and showcase them via the Non-State Actor Zone for Climate Action platform (<http://climateaction.unfccc.int>). Parties also recognized the need to strengthen the knowledge, technologies, practices, and efforts of local communities and indigenous peoples, as well as the important role of providing incentives through tools such as domestic policies and carbon pricing.

### 1.3 Some Research Related to Clean Energy

Renewable energy is encouraged to exploit and maximize its capacity and reach its limit in the next few decades. Countries around the world have been using renewable energy as significant solutions for meeting energy needs economically, ensuring energy security and sustainable development<sup>21</sup>. The capacity and use of renewable energy on a global scale have increased at a faster rate than expected, especially in the electricity

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<sup>18</sup> Art. 9, 10, and 11 – The Paris Agreement 2015.

<sup>19</sup> Art 12 The Paris Agreement.

<sup>20</sup> Global Stock-take (Art. 14).

<sup>21</sup> Liu Zhenmin, ‘View from the pandemic: stark realities, critical choices’ (2021) The Sustainable Development Goals Report 2021 United Nations, New York.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

generation sector.<sup>22</sup> The trend of renewable energy development in recent years has created turning points in the development of the global energy system. The rapid growth of renewable energy demonstrates the commitment of Governments around the world. More than 170 countries have set renewable energy targets, and nearly 150 countries have issued preferential policies for renewable energy development. The private sector also plays an important role in the development of renewable energy on a global scale. This signals a growing consensus that renewable energy technologies will be the engine for sustained growth and economic development.

The cost of electricity generation from renewable energy has decreased significantly since 2010 with the decreasing trend of renewable energy equipment. Led by a trend of 81% decrease in the value of solar power equipment along with other cost reductions, the cost of residential electricity (LCOE) of solar power decreased by 73% between 2010 and 2017, to 10 USC/kWh. In some countries, solar power has been able to compete directly with traditional power sources without financial support. Offshore wind power and concentrated solar power also saw a significant decrease during this period with LCOEs of 14 USC/kWh and 22 USC/kWh, respectively. Bidding results for the two years, i.e., 2016-2017, show a further reduction for these two types of renewable energy by 2020.<sup>23</sup>

The main factors leading to the reduction in electricity costs of renewable energy include improved technology, competitive bidding, and accumulated experience at a large scale with international project developers. The results collected by International Renewable Energy Agency (IRENA)<sup>24</sup> for competitive bidding for renewable power project development through 2022 suggest that the reduction in LCOE will continue to be sustained. IRENA also predicts that, by 2020, the cost of renewable electricity will be in the range of fossil fuel power sources. With an increasing amount of accumulated capacity in regions and countries, renewable electricity development costs will continue to maintain their current downward momentum. Building on this momentum, renewable energy is well-positioned to play a central role in the implementation of international agreements on climate change and sustainable development goals. The results collected by International Renewable Energy Agency (IRENA)<sup>25</sup> for competitive bidding for renewable power project development through 2022 suggest that the reduction in LCOE will continue to be sustained. IRENA also predicts that, by 2020, the cost of renewable electricity will be in the

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<sup>22</sup> Upendra J. Chivukula, 'Clean Energy Slows Climate Change: Chapter 34' (2021) World Scientific Encyclopedia of Climate Change, pp. 305-311 <[https://www.worldscientific.com/doi/10.1142/9789811213960\\_0034](https://www.worldscientific.com/doi/10.1142/9789811213960_0034)> accessed 13 March 2022.

<sup>23</sup> Central Economics Committee of Vietnam, 'Resolution of the Politburo on Orientation of the Viet Nam's National Energy Development Strategy to 2030 and Outlook to 2045' (11 February 2020) Communist Party of Vietnam, Ref. 55 NQ/TW <<http://vepg.vn/wp-content/uploads/2020/03/CPCs-Resolution-55.NQ-TW-on-Energy-Development-Strategy-to-2030-and-outlook-to-2045.pdf>> accessed 11 March 2022.

<sup>24</sup> <<https://www.irena.org/>> accessed 20 February 2022.

<sup>25</sup> Ibid

## Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

range of fossil fuel power sources. With an increasing amount of accumulated capacity in regions and countries, renewable electricity development costs will continue to maintain their current downward momentum. Building on this momentum, renewable energy is well-positioned to play a central role in the implementation of international agreements on climate change and sustainable development goals. Doubling the share of renewable energy to 36% by 2030 is technically and economically feasible.<sup>26</sup>

Accelerating the implementation of energy turning points and developing renewable energy beyond electricity generation can have economic, social, and environmental benefits. Achieving the share of renewable energy by 2030 contributes to an increase in global economic output of 1.3 trillion USD compared to conventional projects.<sup>27</sup> It also contributes to the creation of millions of jobs and significantly reduces the health hazards caused by air pollution. One of the biggest benefits is also creating opportunities for the 1 billion people who do not have access to electric power and the nearly 3 billion people who depend on traditional biomass for cooking. According to the 2018 report of IRENA, to achieve the goal of reducing greenhouse gases under the plan to promote renewable energy, the world needs an investment of 16,000 billion USD by 2050.<sup>28</sup> In which, renewable energy types of mainly onshore wind power 33%, solar power 43%. This is followed by an increased share of renewable electricity, increased investments in energy storage, power transmission, and distribution capacity, flexible power sources, and load regulation. The additional investments help the system to integrate 62% of the power load from wind and solar while ensuring an adequate, stable, and reliable power supply. In the period to 2050, solar power will increase from 233 GW to 7122 GW, wind power from 411 GW to 5445 GW, concentrated solar power from 5 GW to 633 GW, biomass power from 119 GW to 384 GW, geothermal power from 10GW to 227 GW, other forms of renewable energy (tidal, wave, etc.) from 0.3 GW to 881 GW. Thus, wind power and solar power will be the main forms of renewable energy to meet electricity demand in the future. At this rate of growth, electricity from renewable energy will contribute to 85% of total electricity production by 2050 compared to 24% in 2015.<sup>29</sup>

## 2. CLEAN ENERGY IN VIETNAM

Regarding solar energy, in the context of the world's progress in solar energy absorption technology, Vietnam's solar energy sector is considered to have many positive impacts. Solar energy is considered to have strong development potential in the future due to the favorable geographical position of Vietnam, located within the limit between the Equator and the

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<sup>26</sup> Ibid

<sup>27</sup> Ibid, *supra* note 23.

<sup>28</sup> Ibid

<sup>29</sup> Ibid



### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

Tropic of Cancer, in the inner tropical region where the sun shines year-round. However, the exploitation and use of this energy source have been improved with many applications of advanced equipment technology, especially for power generation, hot water heating, drying, etc. The use of this energy source compared to other energy sources is gradually developing and there is competition in the market. On the other hand, mechanisms and policies to encourage the use of solar energy and citizens' awareness have also been gradually improved. In the future, when the exploitation of other energy sources has reached the limit, Vietnam's solar energy source is great potential.

Biomass energy along with solar energy is a potential clean energy source for Vietnam. The source of biomass energy is waste from agricultural products or livestock waste, urban organic waste, and other organic wastes. Vietnam's solid biomass energy source is about 170 million tons and has an electrical output of 2000 MW. This is a great and potential energy source for Vietnam.<sup>30</sup>

Wind energy is also a potential source for Vietnam due to its location in the tropical monsoon region, with a coastline of more than 3000 km. Vietnam's wind power potential ranges from 1785MW to 8700MW. Wind power of Vietnam is not only in coastal areas but also in mountainous areas, especially in valleys along rivers and streams. Vietnam has started implementing some projects to exploit wind power sources in the province of Ca Mau and the province of Ninh Thuan.<sup>31</sup>

In addition, Vietnam also has potential for marine energy such as tides, ocean currents, and burning ice on the seabed. This is an energy source that can meet the needs of economic development in the long-term energy extraction strategy.

### 3. FACTS ABOUT USING CLEAN ENERGY IN VIETNAM

Vietnam has a strategy of clean energy use and development. It is expressed in the Vietnam's Constitution 2013. The State has policies on environmental protection; manage and use effectively and sustainably natural resources; nature conservation, biodiversity; proactively prevent and combat natural disasters and respond to climate change. The State encourages all activities of environmental protection, development and use of new and renewable energy. Organizations and individuals that pollute the environment, deplete natural resources and degrade biodiversity must

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<sup>30</sup> Decision No. 1293/QĐ-TTĐ dated 25/9/05/9/2012 of the Government on the National Strategy on Green Growth 2011-2020 and Vision to 2050; Decision No. 1216/QĐ-TTĐ dated September 5, 2012, of the Government on the National Strategy for Environmental Protection to 2020 with a Vision to 2030; Resolution 11/NQ-CP dated February 18, 2013, of the Government on the Government's action plan to implement Resolution No. 62/2013/QH13 dated November 27, 2013 of the National Assembly on strengthening the management planning, investment, construction, operation and exploitation of hydroelectric projects; Decree 18/2015/ND-CP stipulating environmental protection planning, strategic environmental assessment, environmental impact assessment, and environmental protection plan.

<sup>31</sup> Ibid, *supra* note 23.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

be strictly handled and have the responsibility to remedy and compensate for damage.<sup>32</sup>

In Vietnam, the energy industry has become a large-scale economic sector with dynamic development and deeper international integration. The strong development of the oil and gas industry, with the core being PetroVietnam (PVN), has led to the development of other industries such as power generation, chemical production, liquefied petroleum gas, etc. Oil industry services are also rich and diversified. In these fields, there are domestic and foreign-invested companies. Oil and gas exploitation has brought great benefits both directly and indirectly for socio-economic development. In about 10 years (2007-2017), the production value of the energy industry (coal and petroleum mining, electrical equipment production, electricity and gas production, and distribution) increased six times, contributing 20% value to the total output of the mining industry, the processing industry, the production and distribution of electricity and gas. The industry of manufacturing electrical equipment and manufacturing all kinds of equipment and services in the oil, gas, and coal industries has had some achievements and is increasingly developing. The dynamic development of the energy sector has made an important contribution to maintaining the high growth rate of the whole economy and is an important macro-regulating tool of the Government. The energy sector has actively promoted and effectively performed its role as the economic locomotive of the country. Energy enterprises are the core in the formation of many concentrated industrial parks; play a huge role in socio-economic development, increasing budget income in many localities. In addition to the purpose of electricity development, hydropower plants also have the task of preventing floods downstream in the rainy season, and at the same time providing water for production and people's needs in the dry season.

Many policies on ensuring energy security have been implemented such as reducing coal exports, promoting the exploitation of domestic energy sources, encouraging the development of renewable energy, promoting electricity trading and exchanging with neighboring countries. According to the system of international standards, Vietnam's national energy security has had some indicators that are moving in an unfavorable direction: the ratio of reserves and production of coal, crude oil and gas have been decreasing year by year, per capita, energy consumption is still low. National petroleum reserves have not yet ensured stability in the event of an oil price crisis in the international market.

The priority solution is to establish an energy development fund to support investment in new and renewable energy projects and public utility projects that have not yet been implemented. It has not prioritized allocating preferential credit capital from the development assistance fund (ODA) capital, and other bilateral loans for energy resource prospecting and exploration projects.

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<sup>32</sup> Article 63 of the 2013 Vietnam's Constitution.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

The quality of human resource training is still uneven, there is a shortage of high-quality human resources meeting international standards. Additional training to take the lead in many weak fields is not linked to task requirements, especially in new and renewable energy, bioenergy, refining and petrochemicals, nuclear power, etc.

The structure and operation of scientific and technological research institutions are still inadequate and lacking in depth with limited ability to absorb and improve foreign technology. The research and development (R&D) and innovation are low having not created new technology creation.

According to the report of the Productivity Institute, in the period 2011-2017, the energy industry in the recent period increased capital rapidly, reaching 8.5%/year. The added value is largely based on inputs without a clear improvement in productivity, reaching only 1.05%. In the field of electricity and gas, the labour productivity of some countries in the region is many times higher than that of Vietnam (Taiwan is 3.19 times; Japan is 7.2 times; South Korea is 14.5 times; Thailand is 2.1 times).<sup>33</sup> For Electric Vietnam Group (EVN), labour productivity in 2015 reached about 1.54 million kWh of commercial electricity/person, while Malaysia reached 2.9 million kWh/person, and Tepco Group (Japan) reached 7.5 million kWh/person<sup>34</sup>.

National environmental protection policies and objectives, and the slow issuance of strategic environmental assessments have caused difficulties in the implementation of energy sector projects. After 5-7 years since 2007 as Resolution No. 24-NQ/TW of the 11th Communist Party Central Committee on proactively responding to climate change, strengthening natural resource management and environmental protection, the Vietnam's Government has enacted many legal documents to guide implementing this resolution.<sup>35</sup> National standards and regulations on safety and protection of the environmental and social impact assessment is still lacking, slow to be supplemented according to international regulations and standards. The control and management of energy exploitation technology equipment are not regular. Many old power plants have outdated equipment and lack equipment for treating smoke and wastewater according to advanced standards. Mechanisms and policies for the treatment of ash and slag discharged from coal-fired power plants are slow to be promulgated. Ensuring a good combination of energy exploitation and use with good environmental management has not been paid enough attention in some places. There have been some unfortunate incidents about the environment that cause concern when building new projects. New plants, especially coal-fired power plants, such as air pollution, deterioration of seawater and river water quality, changes in ecosystems, etc. The strong development of hydropower projects from 2006 to 2012 changed the flow mechanism of many natural rivers, reduced biodiversity, and took away a

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<sup>33</sup> Ibid, *supra* note 30.

<sup>34</sup> Ibid, *supra* note 23.

<sup>35</sup> Ibid, *supra* note 30.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

large area of forest and agricultural land. Coal and oil products account for the largest proportion of the structure of the primary energy supply (37.9% and 27.6%, respectively, in 2017).<sup>36</sup> In the coming years, the demand for supply and use of these energy sources will continue to remain high in several industries and transportation leading to increased emissions, and environmental pollution, especially in big cities. Energy is the industry with the highest level of greenhouse gas emissions, which directly affects Vietnam's implementation of international commitments to environmental protection.

In 2015, the Prime Minister issued Decision No. 2068/QĐ-TTĐ approving Vietnam's renewable energy development strategy to 2030 with a vision for 2050. The renewable energy development strategy has encouraged the mobilization of all social resources and people for the development of renewable energy to enhance access to modern, sustainable, reliable energy sources at reasonable prices for all people. It is to step up the development and use of renewable energy sources, increase domestic energy supply, increase gradually the proportion of renewable energy sources in national energy production and consumption to reduce dependence on renewable energy sources, fossil energy, contributing to ensuring energy security, mitigating climate change, environmental protection, and sustainable socio-economic development.

To attract businesses to invest in the renewable energy sector, Decision No. 2068/QĐ-TTĐ stipulates EVN's responsibilities in purchasing electricity and prioritizing capacity mobilization from renewable energy sources. Power producers from renewable energy sources are given priority to exploit the full capacity and develop electricity by the operating mode of the plant. This decision is aimed at protecting the interests of investors, ensuring that they will be able to mobilize maximum capacity and sell all electricity produced from renewable energy sources.

In addition, the electricity price support mechanism is also implemented in the direction that electricity produced from small hydropower sources, wind energy, and solid waste biomass energy is purchased at a higher price than the purchase price of electricity from power sources conventional energy (large hydroelectricity, fossil fuels, etc.). Small hydropower projects and grid-connected biomass power projects enjoy preferential electricity prices. Wind power, solar power, and electricity from grid-connected solid waste are entitled to electricity price incentives according to the feed-in tariff price mechanism (The FIT price for onshore and offshore wind power is equivalent to 8.5 cents/kWh and 9.8 Ascent/kWh; FIT price for solid waste electricity is equivalent to 10.05 Uscent/kWh). This FIT price is applied to the project for 20 years. The selling price is fixed in USD; payment is done in VND (Vietnam Dong) at the time of payment. The purchase price of electricity from renewable energy projects is higher than the average retail price of electricity in Vietnam. The Ministry of Industry and Trade of Vietnam has also coordinated with the

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<sup>36</sup> Ibid, *supra* note 23.

### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

ASEAN Council to issue the "Technical Handbook on Connecting Wind Power to the Vietnamese Grid". The development of renewable energy has many shortcomings, the power transmission system is still not synchronized and meets the requirements. In the year 2017-2018, with incentives for the development of solar energy<sup>37</sup> and wind power<sup>38</sup>, the wind power and solar power have made great progress. By 2019, more than 100 solar power projects and 11 wind power projects have been put into operation with a total capacity of 44,479.5 MW from solar power and 377 MW from wind power, respectively. In addition, about 378 MW of rooftop solar power has been installed, of which the Hochiminh City area accounts for 18%, the southern region (excluding HCMC) accounts for 50% and the central region accounted for 26%.<sup>39</sup> In 2019, the electricity output from rooftop solar power is expected to reach about 99 million kWh 2019. However, because the grid infrastructure has not been developed in sync with the development of renewable energy sources, mainly solar power, the private mechanism has not been opened to invest in the power transmission system. Thus, there have been several projects with reduced capacity. According to the report of EVN,<sup>40</sup> this group has ensured the transmission capacity to mobilize the full power generation capacity of 81/100 renewable energy projects with a total capacity of about 4,400 MW (i.e., ensuring the mobilization of 86% of the capacity of power sources of wind and sun have come into operation). Only 19 factories in the two provinces of Ninh Thuan and Binh Thuan with a total capacity of 670 MW had to partially limit the generating capacity at some point in time due to partial overload of the 110 kV power grid because these 19 projects are all over the world connected on a single circuit 110 kV transmission line<sup>41</sup>. Research by the German Development Cooperation Organization (GIZ) shows that in the province of Ninh Thuan, about 10 solar and wind power projects have had their capacity cut by 38%-65% while in province of Binh Thuan, from mid-2019 to date, renewable energy projects have experienced an average reduction of 30% in generating capacity.<sup>42</sup> It is worth noting that projects that have been in operation for two years ago are also affected by the sharing of generating capacity with new projects put into operation.

There is a paradox currently occurring, the number and capacity of wind and solar power projects proposed to supplement the planning are very large, many times higher than the planned structure, but the amount of actual output power is still very low. The main reason is that the investor's capacity is not guaranteed, the state of offering for sale and project transfer leads to the slow implementation of the project while many capable investors cannot deploy the project because it has not been added to the project. This

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<sup>37</sup> Decision No. 11/2017/QĐ-TTĐ of the Vietnam's Prime Minister.

<sup>38</sup> Decision No. 37/2011/QĐ-TTĐ and Decision No. 39/2018/QĐ-TTĐ of the Vietnam's Prime Minister.

<sup>39</sup> Ibid, *supra* note 23.

<sup>40</sup> Ibid, *supra* note 23.

<sup>41</sup> Ibid, *supra* note 23.

<sup>42</sup> Ibid, *supra* note 23.



### Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

causes a great waste of national resources. The hot development of renewable energy, especially solar energy, is creating great challenges in power system operation while there is a lack of mechanisms and policies to encourage the private sector to invest in national electricity transmission systems.

In general, mechanisms and policies to develop renewable energy, especially wind and solar power, have not kept pace with the market, creating many policy risks for investors. Typically, Decision No. 13/2020/QĐ-TTg was issued in 2020, nearly a year after Decision No. 11/2017/QĐ-TTg expired on June 30, 2019. While the validity of Decision 11 is valid for more than two years, Decision 13 is only valid until the end of 2020. Besides, the Decision's guidance on these documents is not yet available. Regarding wind power, the effectiveness of the FIT mechanism for wind power is relatively short compared to the construction characteristics of wind power<sup>43</sup>. In addition, the bidding mechanism is expected to be put into effect from November 2021 but has not been developed, it is necessary to consider extending the time to suit the actual situation.

The challenges of protecting the ecological environment and international commitments to respond to climate change also create great pressure when implementing the strategy to ensure energy security associated with sustainable development.

#### **4. IMPACT OF INTERNATIONAL TRENDS OF ENERGY ON VIETNAM FIELD FOR THE NEXT PERIOD**

Under the impact of climate change, the criteria of clean electricity production, difficulty to exploit fossil energy, efficient use of energy, along with explosive development of digital technologies and energy markets. Rapidly growing renewables have all contributed to changing the world's energy landscape. The international context has a strong impact on Vietnam's energy development, especially in the context of increasing fuel and energy demand to 2030 and long-term to 2045. With positive impacts, such as developing digital technology applications to improve user efficiency and save energy, converting from using fossil energy to other forms of energy, mainly using renewable energy, the world energy market appeared with non-traditional objects such as low-carbon fuels, fuel cells, smart energy grids, etc. However, the main negative effects, such as shortage crisis, lead to frequent price fluctuations. The emission standards to the environment are getting higher and higher causing pressure to increase the rate of renewable energy. The equipment and the personal use of energy have increased by a factor of two, thereby increasing the demand for domestic energy consumption. With the rapid increase in foreign investment, it is difficult to control the rising energy demand.

In the context of fierce international competition and the implementation of a green growth strategy in reducing greenhouse gas

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<sup>43</sup> Decision No. 39/2018/QĐ-TTg issued in 2018 is valid until 2021.

## Using Clean Energy for Sustainable Development in Vietnam: Facts and Solutions

emissions, Vietnam needs to strongly promote its available market tools and potential to be able to meet the requirements of domestic energy demand so that, in the future, Vietnam will not depend on imported energy sources that Vietnam has the potential to produce and develop.

### 5. CONCLUSION AND RECOMMENDATIONS

From the analysis above, we can see that clean energy plays an important role in the process of sustainable development. Therefore, many countries around the World including Vietnam are changing the way to use energy by replacing traditional energy by clean energy. To protect the environment and use clean energy better for the next period, some measures can be recommended, which are as follows.

First, develop and complete the legal framework and implement policies to form a competitive electricity market. The policy focuses on encouraging domestic and foreign economic sectors to invest in the energy sector, especially the private sector based on attracting investment capital.

Secondly, create a mechanism to encourage the development of renewable energy. Accordingly, to effectively transition to market-based pricing, Vietnam needs to develop a comprehensive price reform plan, and build a strong communication strategy appropriately addressing price increases, efficiency of state-owned enterprises, and energy efficiency.

Thirdly, Vietnam needs to develop mechanisms and policies to encourage the use of renewable energy sources, using, first of all, wind energy, solar energy, and bioenergy. The State needs to have a tax reduction policy to reduce the burden on investors exploiting renewable energy forms.

Fourthly, for wind power and solar power, priority should be given to development by the ability to ensure system safety with reasonable electricity prices. Encourage the development of rooftop and on-water solar power. Develop supportive policies and breakthrough mechanisms for offshore wind power development in association with the implementation of the Vietnam Marine Strategy.

Fifthly, restructure energy-consuming sectors and areas in parallel with implementing policies on clean, economical, and efficient use of energy. Develop sustainable energy infrastructure, connect the region, and improve internal resources of manufacturing and service industries for clean energy development. Restructure, innovate and improve the operational efficiency of state-owned enterprises in the energy sector; encourage the private economy to participate in the socialization of clean energy development.

Using Clean Energy for Sustainable Development in Vietnam:  
Facts and Solutions

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Using Clean Energy for Sustainable Development in Vietnam:  
Facts and Solutions

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